

# Pre AP Chemistry Science Fair

# Sci. Fair Note Book

**Each partner will  
have a Sci. Fair  
Note Book**

- Composition Book

- 3 Ring Binder

- Folder with paper  
attached

Digital book allow only as  
a back up

## **Set up:**

Title page (First page)

Table of contents (2-3 pages)

Everyday you work or science fair start a new  
day and date it, treat like a journal.

# Science Fair, The Process

## What you are interested in...

### Find a problem

Research and discussion,  
formulate a question  
you can investigate

Prepare a  
hypothesis  
and generate  
a materials list



Devise how you will test  
your hypothesis  
through detailed  
experimental  
procedures



Run your  
experiment



Edit your procedures to  
improve your  
experimentation



Rerun experiment,  
and collect  
data



Analysis data, draw  
conclusion against  
your hypothesis

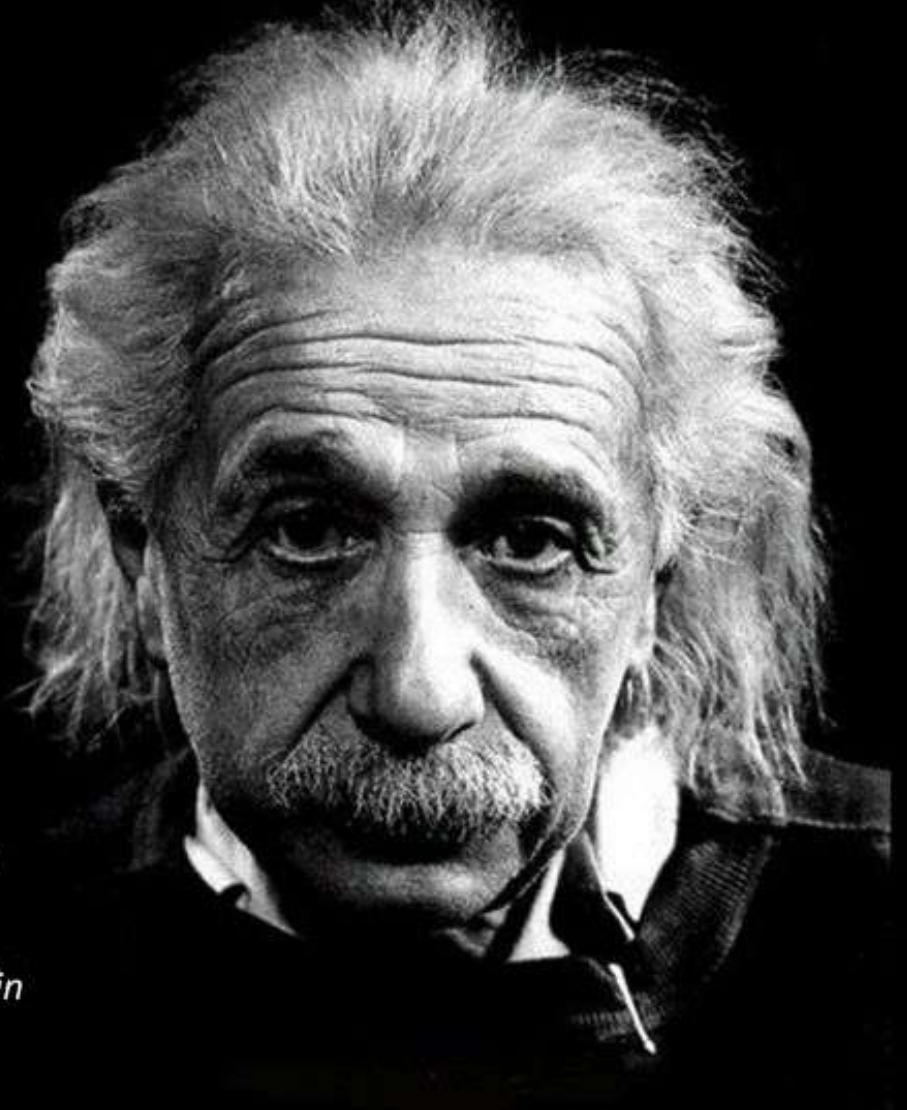


Construct your display  
and prepare to  
present findings

# Formulating a Question

"If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask, for once I know the proper question, I could solve the problem in less than 5 minutes."

- *Albert Einstein*



# Types of Questions

## Comparison

- Which compost composition results in the greatest fruit production in tomatoes as measured by tomato quantity and size?
- What effect does temperature have on the strength of different types of magnets?
- How does increasing the height of a ramp affect how far a ball rolls down the ramp?

# Types of Questions

## Causal

- How does solute concentration affect the rate at which salt dissolves in water?
- Does the type of wood affect how long it burns?
- What is the effect of salt on the boiling temperature of water?

# Types of Questions

## Predictive

- Will an increase in nitrogen concentration negatively impact aquatic plant growth?
- How does increasing the height of a ramp affect how far a ball rolls down the ramp?
- Can a predictive model be made for accurately predicting the landing location of a projectile

# General Goals

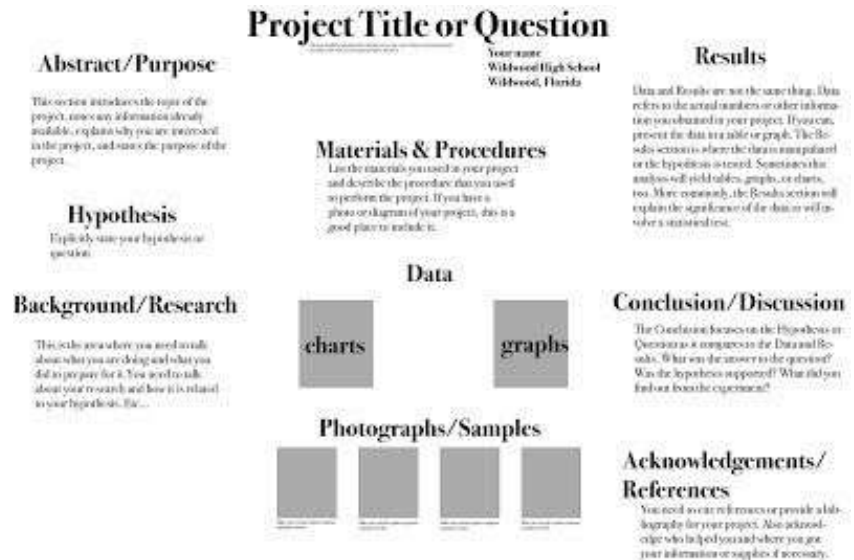
Physical Sciences (not social science)

Avoid any “opinion” or human performance investigations.

Look for a problem to answer or solve

## KISS

Keep  
It  
Simple  
Students





# Semester I Due Date,

Subject to change

Can be found on class web page in Science Fair page.

Science fair note book will be used for due dates

- A. Topic/ Approval, Research/ Introduction, Hypothesis, and Variables **21.Nov.2016**
- B. Experimental approval forms & Materials List and Data Collection Tables/ Charts **28.Nov.2016**
- C. Procedures ver. 1 & initial trial run completed. Preliminary data collected in Sci. Fair Book **12.Dec.2016**

\*Extension available on a case by case basis.

# Semester II Due Dates, Subject to change

- D. Procedures ver. 2 completed\* **27.Jan.2017\*\***  
Begin Experiment and data collection
- E. Experimentation or design build and data collection completed\*. **30.Jan.2017\*\***
- F. Data Tables and graphs for analysis Completes  
**17.Feb.2017\*\***
- G. Presentation Data Tables, Graphs with Analysis, Analysis, and Conclusions complete\* **20.Feb.2017\*\***
- H. Poster Board Completed **21.Feb.2017**

\*Extension available on a case by case basis.

**\*\* suggested completion date**

# Final Board

Put board together @ home, due Finished Tue. 21-Feb-17

- Every piece of writing must be typed (Abstract, Findings, Conclusion, etc.)
- Large Catchy Title & Colors
- Neat & Professional (this is not “bling” contest)
- In logical order (do not put your hypothesis at the end)
- Pictures and visual aides (Graphs, Sketches, etc)
- Typed big enough to see from 3 feet away

# Where to purchase boards



## Tri-fold presentation boards

Michael's Arts & Crafts:

3749 N. Ina

4070 N. Oracle

Target:

4040 N. Oracle

3901 W. Ina

Walmart:

455 E. Wetmore

7635 North La Cholla

# sections to type & put on board

- Title
- Abstract
- Question
- Background Research/Introduction/ Abstract
- Hypothesis
- Materials List
- Procedures (general steps)
- Data Table(s)
- Graph(s)
- Graph Analysis
- Conclusion

# Science Fair

You have already finished & need to type...

Topic- Abstract-Problem- Research- Hypothesis-  
Procedures- Variables- Materials-Experiment-  
Data- and Graph (and rough draft start to  
conclusion)

**If for some reason you haven't.... You *are* expected to do so ASAP. Do not wait for me to tell you. Just do it. Now.**



# Data Table

DATA TABLE

Time (min)	Average Length (mm)
0	5.0
10	4.5
20	4.0
30	3.5
40	3.0
50	2.5
60	2.5
70	2.5

## Data Table Requirements:

- Has a title
- Neatly written or typed up. (on power point or Microsoft Word go to Insert→ Table→ pick # columns and rows. Enter your data.)
- Includes all data you took for the experiment

Data Table for the Cart's Motion

Trial	Time (s)	Position (cm)	Displacement (cm)	Ave. Velocity (cm/s)
1	0	0	_____	_____
2				
3				
4				
5				
6				
7				
8				
9				
10				

# Graphs- Requirements

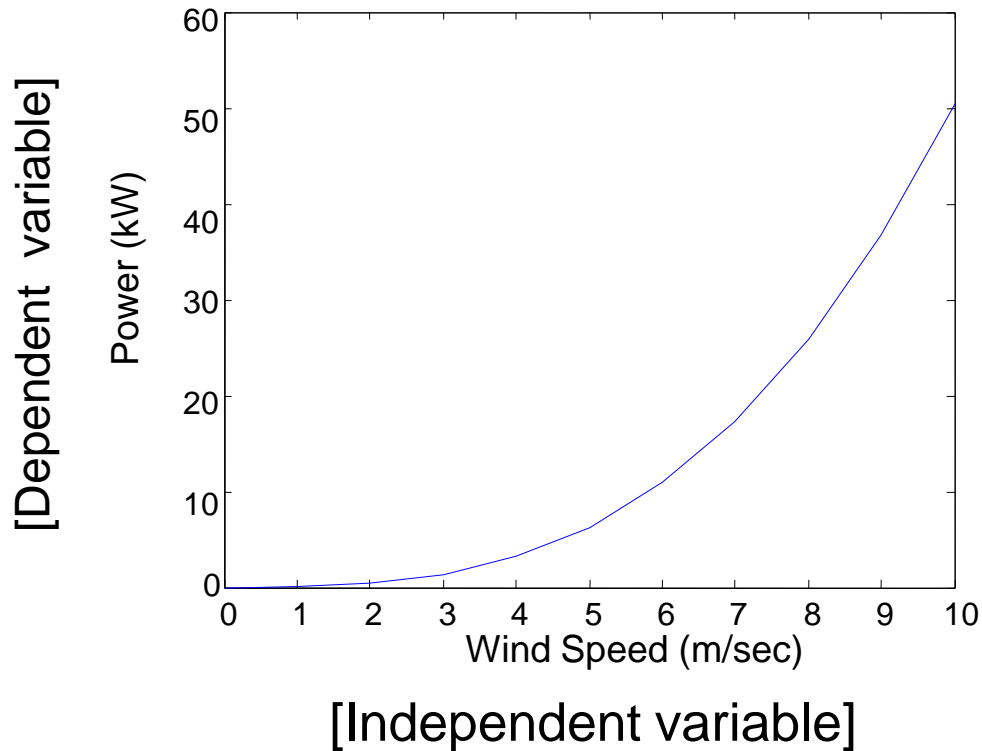
- Done on computer (Microsoft excel, Google Sheets, Open Office)
- Must have a title
- Y-axis and X-axis are labeled
- y-axis numbers have meaning/units (# students, mm, temperature in C, cm growth, mph etc)
- Key/ Legend
- Dependent and Independent Variables labeled
- Is visually accurate (i.e., if one chart value is 15 and another 30, then 30 should appear to be twice the size of 15).



## Example

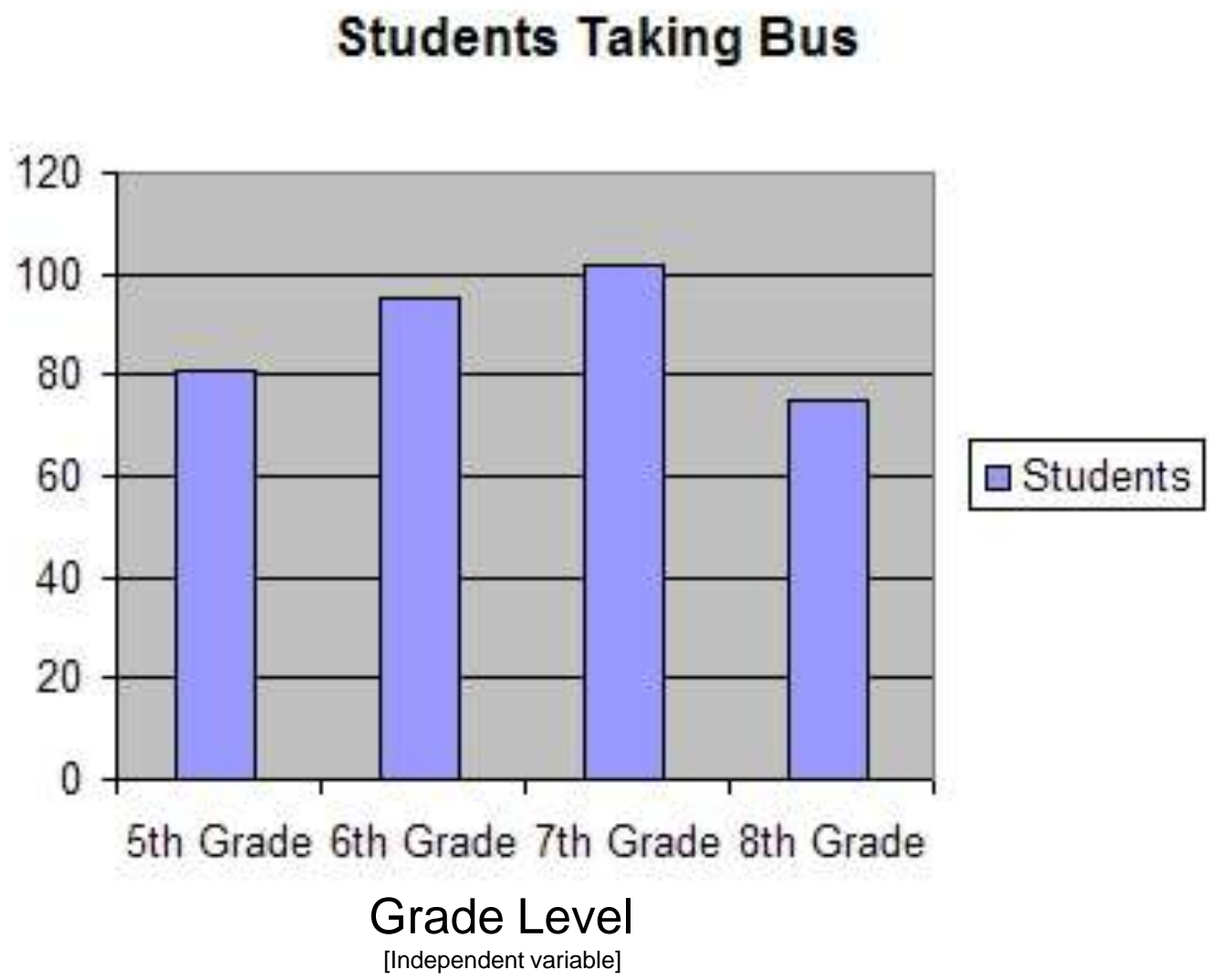
# Example of a graph that draws a conclusion:

How wind generator power changes with wind speed.

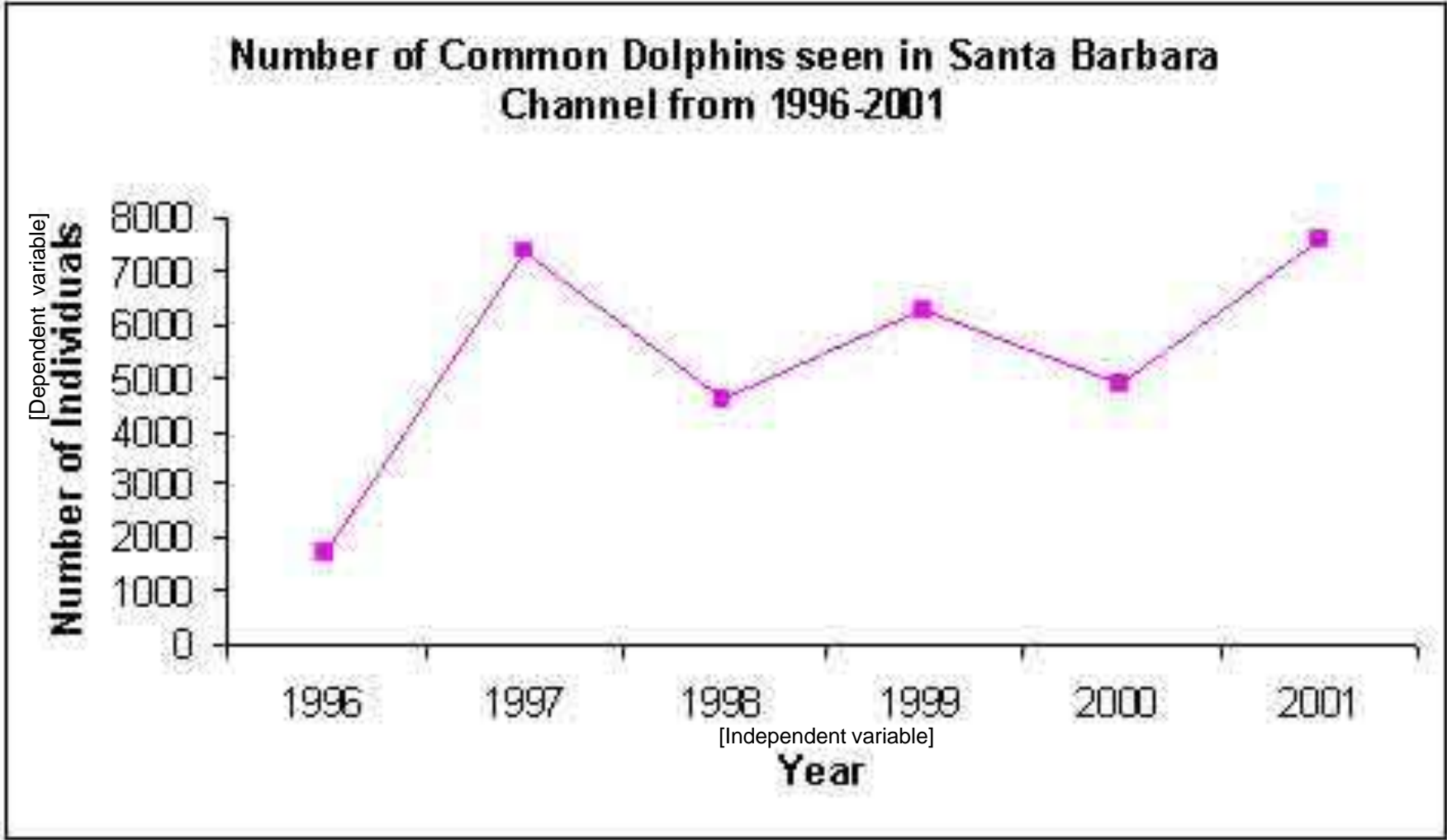


Example

[Dependent variable]  
# Students



Example



# Graph Analysis

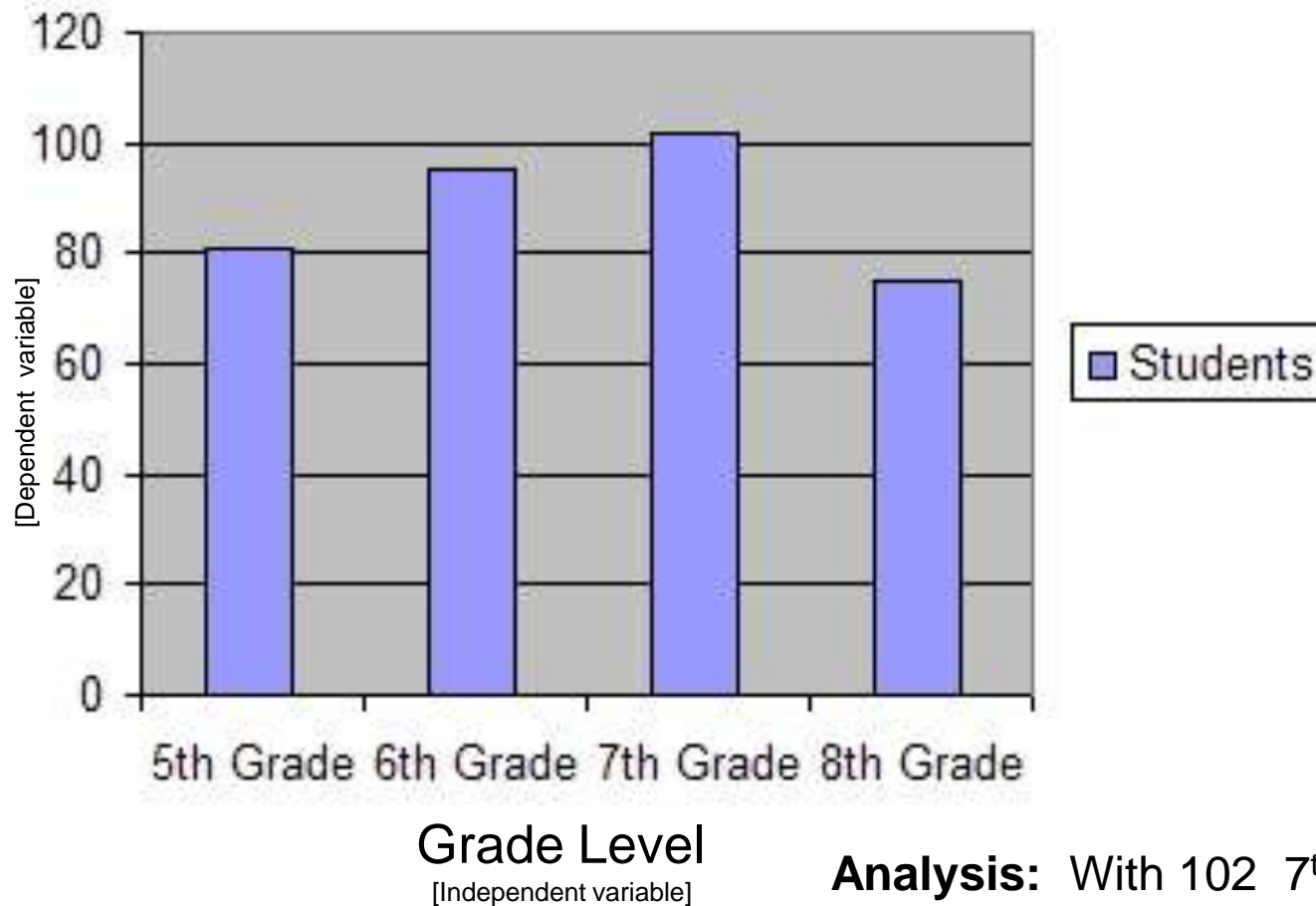
- Summarize your graph in words
- Facts about your data.
  - “The growth of plant A which was exposed to rock music for two weeks was 13 mm”.
  - “Particle board held 13lbs before breaking, metal 25lbs, and paper 1lb”.
  - “The age group 13-25 year olds on average remembered 50 notes of a song after 2 weeks while 25-50 year olds remembered 37”.

**Look for Most, Least, or Trends in the data. Avoid subjective terms like “worst”, “best”. Report only objective findings.**

**Do Not make any statements using “because”, “why” etc. Save interpretation for the Conclusions.**

## Example

### Students Taking Bus



**Analysis:** With 102 7<sup>th</sup> grade students taking the bus, they had the highest ridership of any of the grade levels studied. In general, bus ridership increases from 5<sup>th</sup>-7<sup>th</sup>, but decreases once students enter 8<sup>th</sup> grade.

# Conclusion- Requirements

- Must be typed, use **3<sup>rd</sup> person** (no “I think”, “my data”, etc.)
- Answer the original question (use this as a topic sentence)
- Do you accept or reject your hypothesis.... Why?
- Interpret the results of your experiment (explain the data)
- Include Why you achieved those results

# Conclusion- Requirements, cont.

- What worldly (bigger) conclusions can you draw from these results? What have we learned from this project?
- Confounding factors (errors- not *possible errors*, what actually happened that was an error?)
- How could those errors have affected your data and results?
- How can we build off of this experiment- what are some related questions/experiments to investigate next?

# Done!

